ROOT DISEASE SURVEY AT BOGGS MOUNTAIN STATE FOREST, CALIFORNIA

R. V. Bega[1], D. Dotta[2], D. R. Miller[3], and R. S. Smith, Jr.[1]

In the summer of 1962, several groups of dead and dying pines were reported at Boggs Mountain State Forest in the Coast Range Mountains of northern California. Fomes annosus (Fr.) Cke. was consistently isolated from root samples taken from these trees. Since this fungus is currently considered to be a major threat to forest plantations in the eastern United States, a root disease survey was made on the State Forest in January 1963. The purpose of this survey was to determine the extent of damage caused by F. annosus in a natural forest stand.

Boggs Mountain State Forest, a timber management demonstration forest administered by the California Division of Forestry, consists of 3433 acres located in south-central Lake County, at an elevation of 2500-3600 feet. The principal soil series on the timber-producing areas is an Aikin clay-loam 4 to 5 feet deep. The climate in this area is typical of the north coastal California mountains. Rainfall follows a Mediterranean climate pattern, with long, dry summers and heavy rainfall during winters. Precipitation averages about 40 inches. Some freezing weather is experienced. Temperatures range from a minimum of 15°F in winter to a maximum of 105° in summer.

The forest cover type consists primarily of ponderosa pine (Pinus ponderosa), with sugar pine (P. lambertiana), Douglas-fir (Pseudotsuga menziesii), and incense-cedar (Libocedrus decurrens) present in various but minimal densities. Nearly all of the forested land can be considered well stocked. From 1948 to 1952, the area was logged of all merchantable timber except for seed trees and scattered patches of mature trees. Since then conditions for natural regeneration have been favorable. Practically all areas left unstocked after logging now have excellent stands of reproduction, with ponderosa pine predominating.

During the 1963 survey, root diseases caused by F. annosus and Armillaria mellea (Vahl. ex Fr.) Quél. were found in 69 distinct infection centers causing the death of approximately 800 trees, ranging in size from seedlings up to trees 41 inches in diameter (Fig. 1). Infection centers ranged in size from those containing 1 dead or dying tree to those with as many as 62 infected trees. In 58 infection centers the trees were attacked by F. annosus, in 7 centers by A. mellea, and in 4 centers by both pathogens. Most F. annosus infection centers were associated with stumps left from the 1948-1952 harvest. In these cases the fungus was found to be killing

[1]Principal Plant Pathologist and Plant Pathologist, respectively, Pacific Southwest Forest and Range Experiment Station, Forest Service, United States Department of Agriculture, Berkeley.
[2]Forester, California Division of Forestry, Sacramento, California.
[3]Plant Pathologist, California Region, Forest Service, United States Department of Agriculture, San Francisco, California.

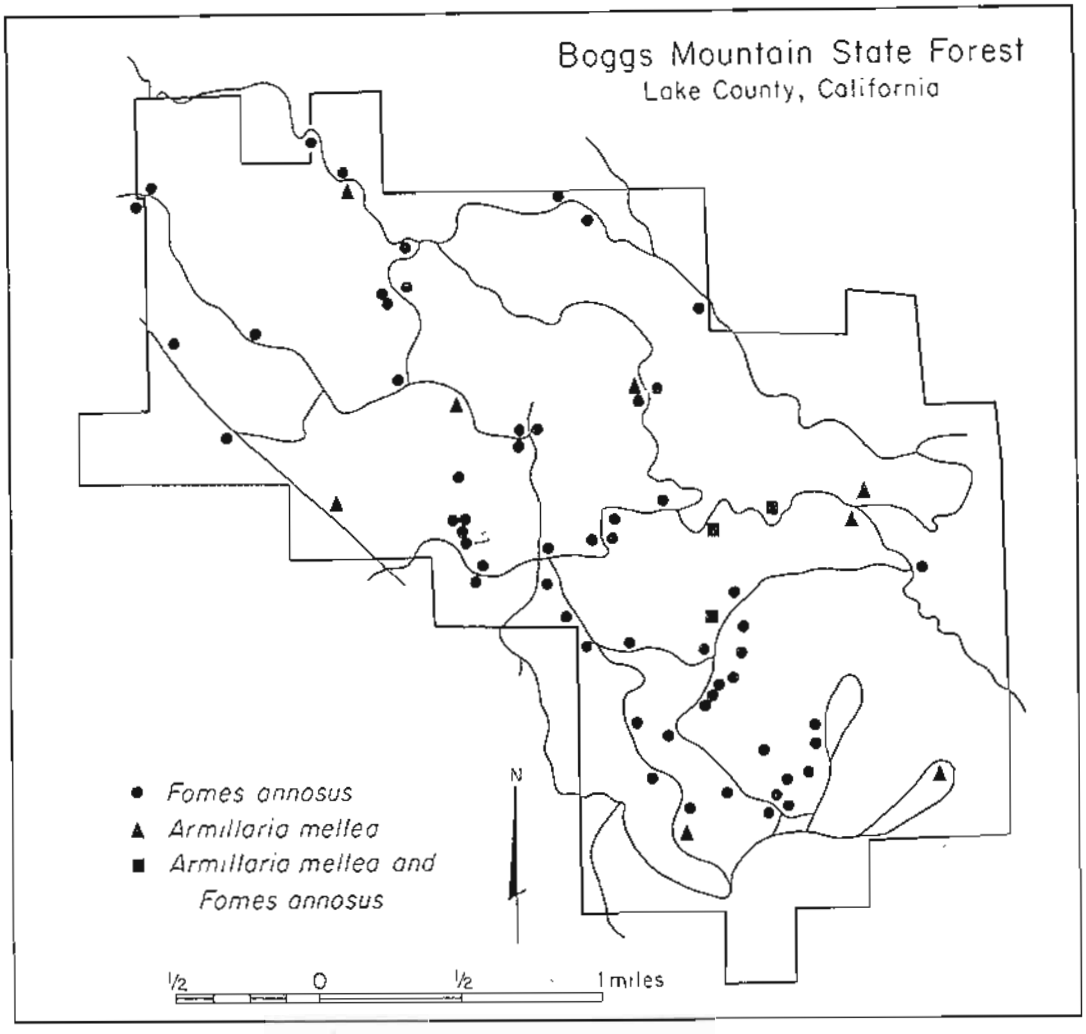

FIGURE 1. Distribution of root disease infection centers on the Boggs Mountain State Forest.

the reproduction around the infected stumps. Many such stump-associated infection centers have since coalesced, thereby seriously reducing the density of the reproduction. The fact that these infection centers are still very active indicates that the stocking density probably will continue to be reduced even more.

Twenty-five ponderosa pines with a diameter breast height ranging from 6 to 41 inches, and which showed signs of being killed by Dendroctonus brevicomis Lec., were found to have extensive root disease caused by F. annosus. In attacking the roots, the fungus had so weakened the trees that they were undoubtedly predisposed to bark beetle attack. Owing to the extensive damage to the root systems, these trees would have died within a few years even if beetles had not attacked.

These findings further support the growing concern over damage by F. annosus in existing natural forest stands and in second-growth forests as well as in future plantations. They show that this fungus is a much greater menace in California than past reports would indicate.

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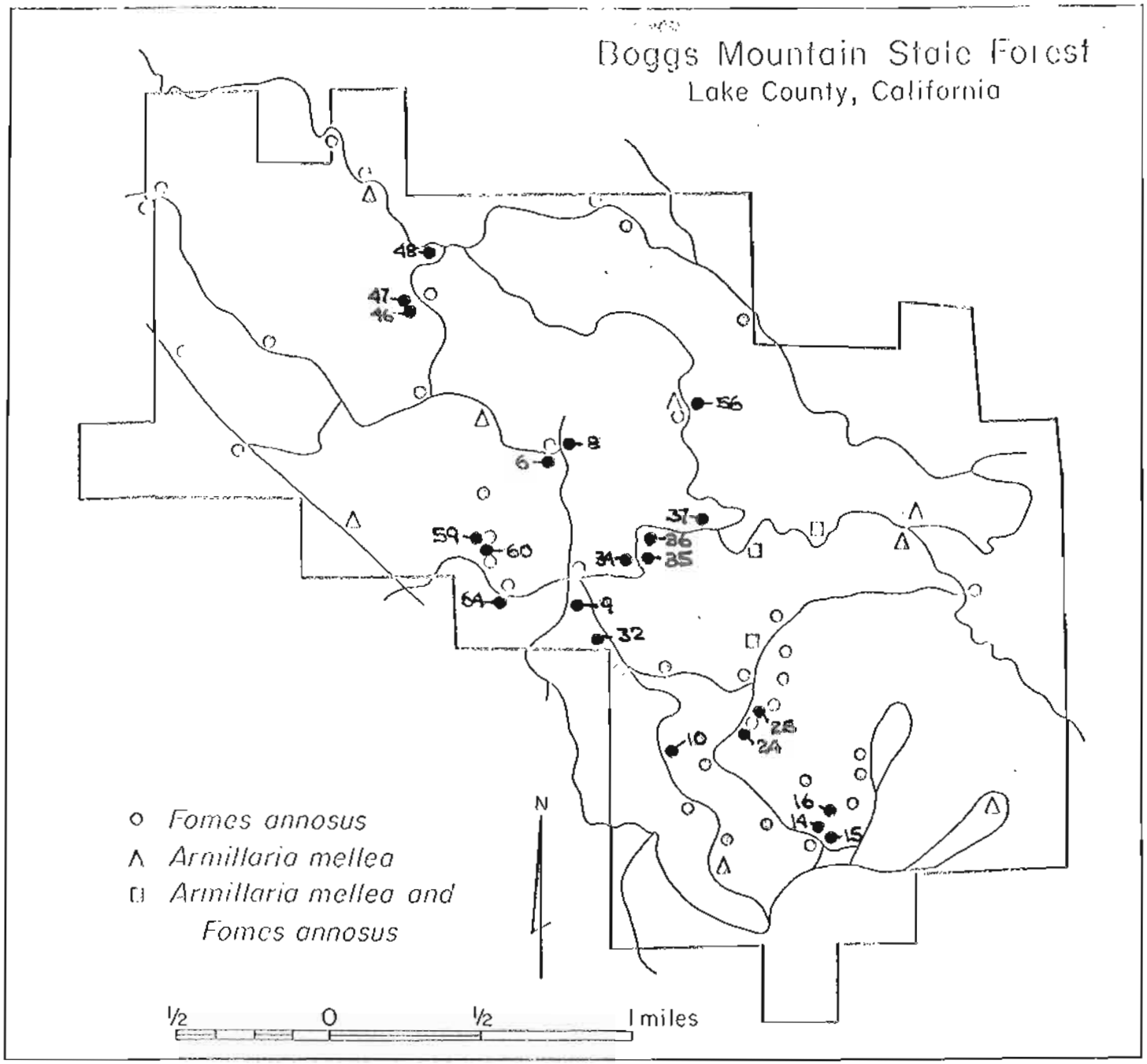

PLOTS FOUND
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